

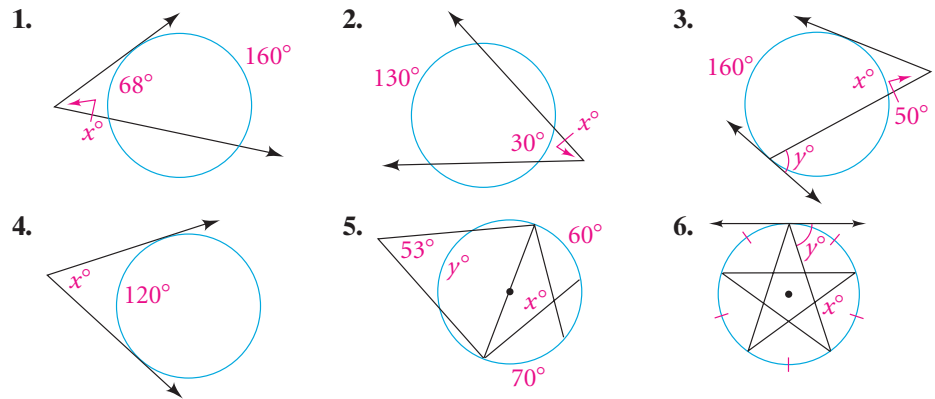
EXERCISES

For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example x^2 Algebra Find the value of each variable.

Example 1
(page 608)

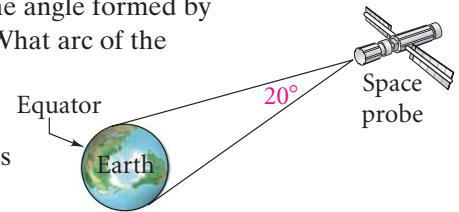


Example 2
(pages 608–609)

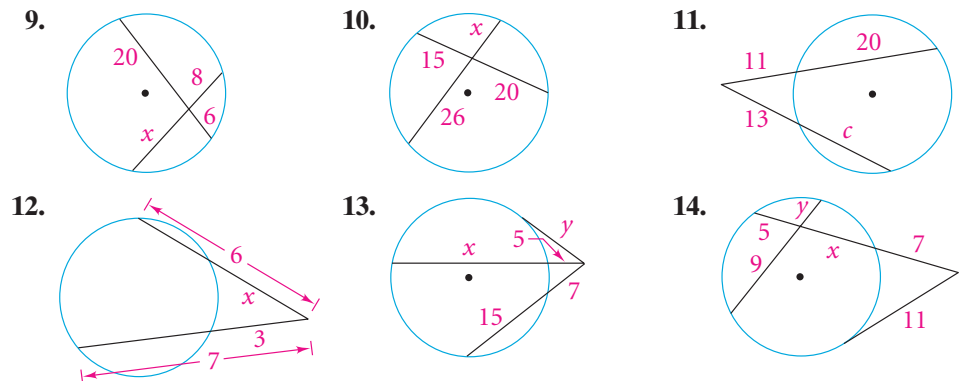


7. Astroscience A departing space probe sends back a picture of Earth as it crosses the plane of Earth's equator. The angle formed by the two tangents to the equator is 20° . What arc of the equator is visible to the space probe?

8. At the left, the cross section of the ball is a circle. About how many degrees is the arc of the circle that is below the points of contact with the hands?



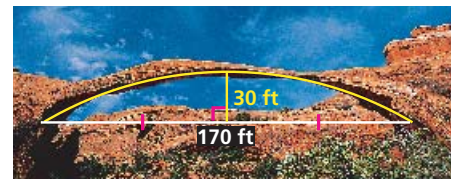
Example 3 x^2 Algebra Find the value of each variable using the given chord, secant, and tangent lengths. If the answer is not a whole number, round to the nearest tenth.



Example 4
(page 610)

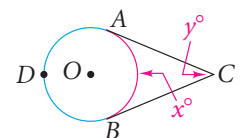
Geology This natural arch, in Arches National Park, Utah, is an arc of a circle.

15. Find the diameter of the circle.
16. The chord length shown is rounded. It could range from 165 ft to 175 ft. Find the corresponding range for the diameter.

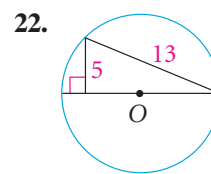
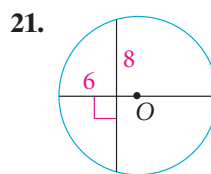
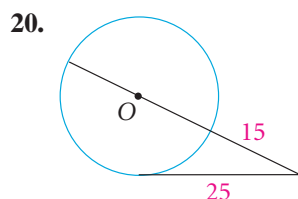


B Apply Your Skills x^2 Algebra \overline{CA} and \overline{CB} are tangents to $\odot O$. Write an expression for each arc or angle in terms of the given variable.

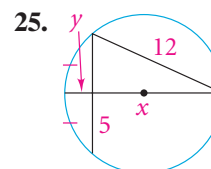
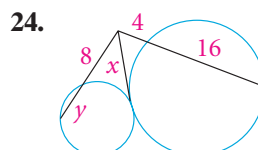
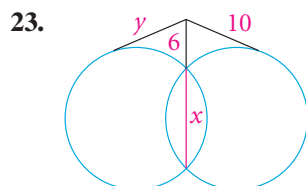
17. $m\widehat{ADB}$ using x
18. $m\angle C$ using x
19. $m\widehat{AB}$ using y



Find the diameter of $\odot O$. If your answer is not a whole number, round it to the nearest tenth.

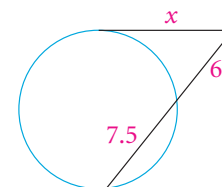


Algebra Find the values of x and y using the given chord, secant, and tangent lengths. If your answer is not a whole number, round it to the nearest tenth.

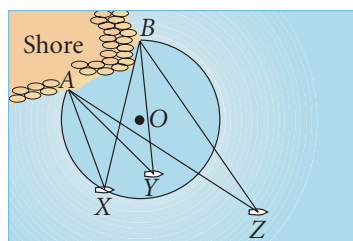


26. **Error Analysis** To find the value of x , a student wrote the equation $(7.5)6 = x^2$. What error did the student make?

27. A circle is inscribed in a quadrilateral whose four angles have measures 85, 76, 94, and 105. Find the measures of the four arcs between consecutive points of tangency.



Exercise 26



Navigation The map at the left shows that the waters within \widehat{AXB} , a 300° arc, are unsafe. Here are what the letters represent.

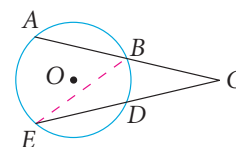
A: a lighthouse B: a lighthouse X: locations of a ship on $\odot O$
Y: locations of a ship inside $\odot O$ Z: locations of a ship outside $\odot O$

a. Critical Thinking What measures are possible for $\angle X$? For $\angle Y$? For $\angle Z$?
b. Writing Using the angles a ship makes with the lighthouses (like angles X, Y, and Z), explain how a navigator can be sure the ship is in safe waters.

29. Write a plan for a proof for Theorem 11-11, Part (2) as it applies to two secants that intersect outside a circle.

Given: $\odot O$ with secants \overline{CA} and \overline{CE} intersecting at C

Prove: $m\angle ACE = \frac{1}{2}(m\widehat{AE} - m\widehat{BD})$



Proof 30. Prove the other two cases of Theorem 11-11, Part (2). (See Exercise 29.)

Proof For Exercises 31 and 32, write proofs that use similar triangles.

31. Prove Theorem 11-12 (II).

32. Prove Theorem 11-12 (III).

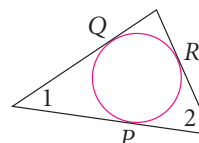
33. Explain why Theorem 11-12 is true when the given point is on the circle.

Challenge **Proof** In Exercises 34–37, prove each statement or theorem.

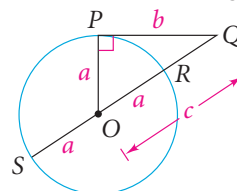
34. $m\angle 1 + m\widehat{PQ} = 180$ 35. $m\angle 1 + m\angle 2 = m\widehat{QR}$

36. the Pythagorean Theorem (Use the diagram at the right and the theorems of this lesson.)

37. The tangents to a circle at the vertices of an inscribed equilateral triangle form an equilateral triangle.



Exercises 34, 35





Standardized Test Prep

Gridded Response



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Online lesson quiz at
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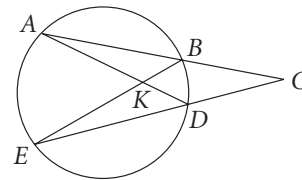
38. If $m\widehat{AE} = 86$ and $m\widehat{BD} = 40$, find $m\angle BKD$.

39. If $AK = 14$, $EK = 17$, and $BK = 7$, find DK .

40. If $BC = 6$, $DC = 5$, and $CE = 12$, find AC .

41. If $m\angle C = 14$ and $m\widehat{AE} = 140$, find $m\widehat{BD}$.

42. If $m\widehat{AB} = 110$ and $m\widehat{DE} = 130$, find $m\angle AKE$.

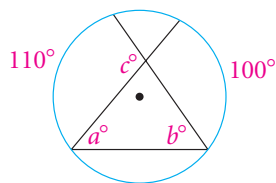


Mixed Review

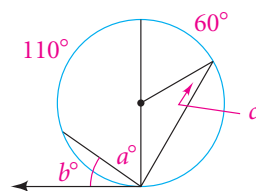
Lesson 11-3

Find the value of each variable.

43.



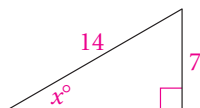
44.



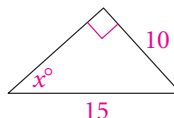
Lesson 9-2

Find the value of x to the nearest degree.

45.



46.



47.



Lesson 8-6

48. The areas of two similar parallelograms are 20 cm^2 and 3.2 cm^2 . Find the similarity ratio of the larger parallelogram to the smaller parallelogram.

Geometry at Work

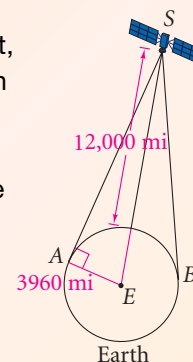
Aerospace Engineer

Aerospace engineers design and build all types of spacecraft, from the low-orbit space shuttle to interplanetary probes. Much of today's work involves communications satellites that relay television, telephone, computer, and other signals all over the world. The portion of Earth's surface that can communicate with a satellite increases as the height of the orbit increases.

Earth has a radius of about 3960 miles. The figure at the right shows a satellite 12,000 miles above Earth. \widehat{AB} is the arc of Earth that is in the range of the satellite. You can find $m\widehat{AB}$ by finding $m\angle AEB$, which is twice $m\angle AES$.

$$m\widehat{AB} = m\angle AEB = 2m\angle AES = 2 \cdot \cos^{-1}\left(\frac{3960}{3960 + 12,000}\right) \approx 151.3$$

The measure of the arc of Earth in the range of the satellite is about 151.3.



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